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Does experiencing homelessness affect women's motivation to change alcohol or drug use??

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Abstract

Background and Objectives—Homeless women are at high risk of drug and alcohol dependence and may receive less opportunity for treatment. Our objective was to examine the association between experiencing homelessness and motivation to change drug or alcohol use.

Methods—Women (n=154) participants in a study of substance dependence at an urban medical center (69 with some homeless days in the last 90 days; 85 continuously housed at baseline) completed 6 items rating motivation to change alcohol or drug use (i.e., importance, readiness, and confidence) at baseline and in 3, 6, and 12-month follow up interviews. Unadjusted, and longitudinal analyses controlling for covariates (e.g., demographics, insurance status, substance use consequences, mental health status, and participation in treatment), were conducted.

Results—There were no significant differences between women experiencing homeless days versus continuously housed women in the odds of reporting high motivation to change alcohol or drug use, either in unadjusted baseline analyses or longitudinal analyses adjusted for covariates. Covariates that were significantly associated with high importance, readiness or confidence to change behavior were higher life time consequences of substance use, and participation in 12-step programs.

Discussion and Conclusions—The findings suggest that clinicians should not make assumptions that homeless women have low motivation to change their substance use.

Scientific Significance and Future Directions—The same opportunities for addiction treatment should be offered to homeless as to housed women.

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Keywords

Women; Homelessness; Motivation to Change; Alcohol Dependence; Drug Dependence

Background and Objectives

Homeless women have a high prevalence of risky use of both alcohol and illegal drugs. (1–3), five to fourteen times higher than the general population of women (4). Prospective studies have found that a current substance use disorder, or frequent continued consumption of alcohol or drugs are associated with lower odds of exit from homelessness, prolonged episodes of homelessness, and housing instability. (5–7) Despite high need, homeless adults report limited use of addiction services. Robertson et al., (4) found that 43.5% of homeless adults identified a need for addiction treatment but had not received services, while Wenzel et al., (8) reported only 27.5% of homeless adults with a substance use disorder had accessed inpatient or residential treatment in the last year, with even fewer, 5.6%, having any outpatient treatment.

Reasons associated with lack of use of addiction services or motivation to quit alcohol or drug use among homeless women include poor mental health status, emotional distress, and depression. (9–11) Further, having a substance abusing partner, and experiencing childhood abuse, which could result in post-traumatic stress symptoms, were found to be associated with less positive views of quitting substance use. In addition, both homeless men and women living with children have lower addiction treatment utilization. (12) However, reporting more addiction consequences appears to be associated with higher motivation for treatment, positive attitudes towards treatment, and treatment engagement in populations with a high prevalence of homelessness. (2, 12, 13)

Sosin et al., (10) suggested a rational choice model among competing needs to explain why homeless individuals do not enter addiction treatment. One aspect of this decision process for homeless women may be the experience of discomfort in programs that serve predominantly men and resulting fears of re-victimization. (11) This may be expressed in ambivalence to seek treatment, and may be misinterpreted by providers as low motivation for treatment. In addition, medical providers may stigmatize the homeless and fail to offer optimal treatment (14, 15), especially if the individual has alcohol or drug use problems. (16) Provider beliefs include assumptions about lack of motivation and ability to engage in self-management. (17) Thus limited receipt of addiction treatment services among homeless women may result from both miss-matched services and inaccurate provider assumptions.

Few data exist that explore motivation for addiction treatment services among homeless women. The current study investigated the association between experiencing homelessness and motivation to change alcohol or drug use among women with substance dependence.

Methods

Sample

Study participants were women enrolled in the AHEAD (Addiction Health Evaluation and Disease management) study, designed to test the effectiveness of a disease management intervention in primary care for alcohol or drug-dependent adults. Participants were recruited from multiple sources, including an inpatient detoxification unit (74% of those enrolled), primary care clinics, an emergency department, and by advertisements on buses and in newspapers from 2006–2008, and randomized to treatment condition after study baseline assessments. Eligibility included: 1) a diagnosis of current alcohol or drug

dependence assessed by the Composite International Diagnostic Interview Short Form (CIDI-SF) (18); 2) past 30 day drug or heavy alcohol use; and 3) willingness to receive primary medical care at the medical center where the study was being implemented. Of 2029 individuals screened, 1374 were not eligible due to unwillingness to establish primary care at the study medical center (44%), cognitive impairment (28%), not meeting substance use criteria (9%), and pregnancy, language barriers (not English or Spanish speaking), or unable to provide contact information for two relatives or friends. Only 85 total participants who met criteria declined to enroll. Motivation to change, or interest in seeking help, were not entry criteria. All women enrolled in the AHEAD study, in the intervention or comparison condition, were included in the current analysis. Data were collected at study entry and 3, 6 and 12 months later. The intervention consisted of an addiction Chronic Care Management program in a primary care clinic, and options for motivational enhancement sessions, counseling, pharmacological treatment, and referrals to specialty addiction services and support groups. Comparison participants were given a referral to a primary care clinician, the opportunity to participate in motivational enhancement sessions, and a list of addiction resources. The Institutional Review Board for Boston Medical Center and Boston University Medical Campus approved the study.

Measures

Outcomes—The motivation- to-change variables were the six, binary outcomes of interest (three corresponding to drinking and three to drug use) developed from a visual analog or ‘change ruler’ scale.. Respondents were asked to circle the number that indicated the way they feel ‘right now.’ The items addressed readiness, importance and confidence, respectively for alcohol and drug use. (19) The questions were: “How important is it to you right now to change your drinking/drug use?;” “How ready are you to change your drinking/drug use?;” and “If you decided to change your drinking/drug use habits, how confident are you that you would succeed?” Respondents were shown a card that listed the numbers 0, 1, 2, etc. through 10, adjacent to a horizontal line or ‘ruler.’. Groups of numbers were bracketed and given a label: 0 was labeled “I don’t drink/use drugs; doesn’t apply;” 1–3 were labeled, “not important,” “ not ready,” or “not confident;” 4–6 were labeled, “somewhat important,” “somewhat ready,” or “somewhat confident;” and 7–10 were labeled, “very important,” “very ready,” or “very confident.” This measure has been found to be highly correlated with lengthier questionnaires that measure motivation and that categorize respondents into ‘stages’ of change (0.77), and better predicted actual changes in behavior such as lower alcohol consumption. (20,21) Responses were dichotomized at 7 or greater indicating high motivation. Responses for any time point that the participant reported using no alcohol or no drugs were excluded from the analysis.

Main independent variable—Experiencing homelessness was defined as self-report of having spent one or more nights in a homeless shelter or on the street in the past 90 days. Women who reported no days in a homeless shelter or on the street were considered continuously housed.

Covariates—Demographic information included age, ethnicity, education, employment status, income, health insurance status, homeless days, whether they currently had a partner, and whether they had children. Additional variables were collected using well standardized instruments widely used with low income urban and homeless populations. Physical and mental health status were measured by the 12-item Short Form health survey (SF-12) and summarized by Physical and Mental Component Summary scores (PCS, MCS). (22) The SF-12 is one of the most widely used measures of self-report health status in health research; each component score consists of six items. Internal reliability is 0.88 and 0.82 for the physical and mental component scores respectively. The SF-12 provides a population

normed scale centered at 50 points indicating average health and has strong concurrent and predictive validity for health related quality of life outcomes. (23)

Medical comorbidity was assessed using The Katz questionnaire (24) which includes 17 yes/no questions that ask for the presence of a condition as well as validating follow up questions.. Examples of the questions are: *Have you ever had a heart attack? Do you have cirrhosis or serious liver damage? Do you have asthma? If yes, do you take medications for your asthma?* This measure was validated by medical record review. Test – retest reliability exceeds 0.91 and correlations with medical record information range from 0.63–0.70.

Mental health conditions were assessed using the Patient Health Questionnaire (PHQ-9) (25) for depression and the Mini-International Neuropsychiatric Interview (MINI) for post-traumatic stress disorder (PTSD). (26) The PHQ-9 is a nine item questionnaire designed for use in primary care that captures DSM-IV criteria for depression symptoms, including mood, somatic symptoms, and suicidal ideation by asking frequency of symptoms for the last two weeks. Internal reliability is high, α=0.89, with 88% sensitivity and specificity for major depression diagnosed by psychiatric interview. The MINI is a standardized interview of yes/no questions to identify DSM-IV psychiatric conditions and is commonly used in research settings where longer interviews are not possible. The PTSD items include three screening questions (ex. *Have you ever experienced or witnessed or had to deal with an extremely traumatic event that included actual or threatened death or serious injury to you or somebody else?)*, two lists of symptoms experienced in the last month (7 items on avoidance of places or people related to the event and 5 items on general anxiety symptoms), and a question about symptom interference with work or social activities. Test-retest reliability is 0.73, and sensitivity is 0.68 and specificity 0.91 compared with psychiatric interview.

Lifetime consequences of substance use were measured using the Short Inventory of Problems (SIP), one version for alcohol and one for other drugs. (27) The SIP consists of 15 items, and using the two versions provides lifetime consequences separately for alcohol and drug use. Items cover physical, social and interpersonal consequences of alcohol or drug use and have high internal consistency in studies of addiction treatment interventions, including those conducted in primary care (α=0.95). Respondents were also asked about participation in outpatient services, and 12-step meeting attendance at each time point.

Analysis

Differences between those experiencing homelessness vs. those continuously housed at baseline were identified using two sample t-tests or chi-square tests as appropriate. To minimize the potential for collinearity in subsequent regression analyses, we assessed the correlation between pairs of independent variables and covariates and eliminated some covariates from the final models. No pair of variables included in the regression models was highly correlated ($r>0.40$).

Generalized estimating equations (GEE) logistic regression models (28) were used to examine the longitudinal association between homelessness experience and motivation to change across 12 months of study enrollment, adjusting for the potential confounding factors of age, race/ethnicity, income, education, insurance status, partner status, SIP lifetime alcohol and drug scores, outpatient treatment and 12-step meetings attended in the last 90 days, and time. The GEE approach was used to adjust for the correlation due to analyzing longitudinal, repeated measures from the same subject over time, increasing the efficiency and power of the analyses compared to analysis using a single time point. An independence working correlation was used and the empirical standard errors are reported for all analyses. Homelessness, any outpatient treatment, and any 12-step meetings, were modeled as time-

dependent variables. No adjustments were made for multiple comparisons due to the exploratory nature of the analyses.

Secondary, exploratory analyses were also conducted to evaluate the potential interaction between homelessness and the AHEAD intervention. In addition, secondary analyses explored whether greater time homeless was associated with motivation to change substance use among homeless women. Examination of the distribution of days homeless among homeless women at baseline resulted in use of the median split of <15 days/≥ 15 days in the past 90 days for this analysis. All analyses were conducted using two-sided tests and a significance level of 0.05. Analyses were performed using SAS software. (29)

Results

The AHEAD study enrolled 563 participants of whom 154 were female Among the 154 women, 69 reported at least one night in a shelter or on the street in the last 90 days at study entry, and 85 reported no days on the street or in a shelter. Among those reporting homeless days, the range was 1–90 days, with a median (IQR) of 15 days (4, 60), and a mean of 33.5 days (SD= 34.9); 13% were continuously homeless all 90 days. There were no significant differences in demographic characteristics, intervention condition, or participation in motivational engagement treatment sessions between the two groups at baseline (see Table 1). About half of women from both groups had low income, many were unemployed, most were insured, and high school graduates or had some post-secondary education. Alcohol and drug use measures, prevalence of PTSD and depression, and recent 12-step meeting attendance were high for both groups. However, a higher proportion of women experiencing homelessness reported being troubled by alcohol problems ($p<0.05$). Women experiencing homelessness also reported significantly more total lifetime consequences of alcohol use (SIP lifetime alcohol score, $p<0.05$) than did continuously housed women.

Table 2 presents the observed proportions with high levels of importance, readiness, or confidence in the ability to change alcohol or drug use for both groups at each study visit. In unadjusted analyses, there were no statistically significant differences in at baseline. Approximately three quarters of both groups expressed high importance and readiness to change alcohol use, and approximately 90% expressed high importance to change drug use. Responses over time showed few differences in any of the motivation questions.

In the multivariable longitudinal analyses, similarly, no significant associations were detected between women experiencing homelessness and continuously housed women for any of the outcome variables. Further, no significant differences were found for race/ethnicity, insurance status, partner status, or income. Examining covariates (see Table 3), 12-step meeting attendance (AOR 1.74–2.52 for high readiness and confidence in changing drinking and high importance and readiness to change drug use) and lifetime substance use consequences (SIP) scores (AOR 1.14–1.16 for high importance and readiness to change drinking and high importance to change drug use) were associated with increased motivation to change alcohol and drug use. Secondary analyses did not identify a significant interaction between homelessness and intervention group. In the adjusted longitudinal analyses only among women experiencing homelessness (data not shown in a table), more homeless days (i.e., ≥ 15 days) were associated with a higher odds that changing drug use was highly important (AOR 4.92, 95%CI 1.46, 16.65, $p<0.01$). No other significant associations were observed.

Discussion and Conclusions

The primary focus of this study was to examine if homelessness experience was associated with motivation to change drug or alcohol use over time among women with substance

dependence. We found no significant differences at baseline or in longitudinal analyses of the proportion of women experiencing homelessness compared to continuously housed women who rated high motivation to change alcohol or drug use on any of six motivation-to-change questions. Further, when examining the effects of having more homeless days, we found that only one motivation variable was significantly different between women with more versus fewer days homeless. Women with ≥15 days homeless more often endorsed high importance to change drug use compared to women who reported fewer than 15 days homeless.

Motivation for changing alcohol or drug use, and denial of substance use problems, as predictors of treatment engagement and recovery have been core constructs for several decades. (30) Assumptions about motivation to change substance use of populations, such as homeless women, could impact whether or not they receive addiction treatment or respond to it well. (9, 16) For example, clinicians who assume homeless women are not motivated, may not make referrals to addiction treatment programs. (14,15)

The readiness to change model postulates that individuals are in varying stages of readiness to change their addictive behavior and a primary goal of treatment is to move patients along a continuum of change to increase their commitment to address their addictive problems. (31) While evidence about the importance of motivation for successful treatment engagement or outcomes is limited, and at times contradictory, it may be one factor contributing to addiction outcomes. Kelly et al., (32) for example, found high motivation at treatment entry, and increases in motivation were among the factors positively predicting three month abstinence among young adults in residential addiction treatment, although the association disappeared in a multivariate model. Collins et al., (33), similarly found that readiness to change did not predict future reductions in level of drinking among college students, and suggested that motivation had minimal potency in the face of contextual (peer pressure), biological, or personality variables. In contrast, Collins, Malone & Larimer (34) found that motivation to change drinking, and not treatment participation, predicted reduced alcohol use outcomes in homeless individuals with alcohol use problems participating in a housing intervention. While the latter study enrolled mostly homeless men, it does suggest that motivation to change, combined with contextual factors (such as a housing program) may play a key role in improved substance use outcomes among the homeless.

Examining covariates for the entire sample, lifetime consequences of substance use were associated with high importance and readiness to change alcohol use, and high importance to change drug use. Although power issues may have prevented significant findings for the homeless-only subsample analyses, the pattern of point estimates was the same, suggesting that, similar to other studies (2, 9, 13), greater addiction consequences are associated with higher treatment motivation and treatment engagement in women who experience homelessness. In addition, the strong association of 12-step attendance with motivation for changing substance use is striking in the combined sample, with similar, although not statistically significant pattern of findings in the homelessness experience-only subsample, and consistent with studies with other substance dependent populations. (32). In contrast, mental health functioning (MCS score) for the combined sample was not associated with five out of the six motivation to change items. These findings seem to contradict those studies among homeless women that have found better mental health status cross-sectionally and prospectively associated with lower drug and alcohol use, and more addiction treatment completion. (11, 35, 36) However, a study by Nyamathi et al., (9) found that positive attitudes about quitting drug and alcohol use were not significantly related to global mental health symptoms, but rather to coping strategies, history of abuse, and social support. This suggests there are multiple pathways potentially influencing motivation to change risky

substance use among women who have experienced homelessness that warrant further exploration.

A few limitations in this study should be noted. Our sample size was small, which may have limited our ability to detect meaningful associations between homelessness and measures of motivation, even though we utilized longitudinal data. This limitation may be of particular relevance since all odds ratio point estimates for the associations between homelessness experience and motivation were <1, but not statistically significant. In contrast, the point estimates for the associations between more nights homeless and motivation were largely >1, also not statistically significant, providing no evidence that those experiencing homelessness are less motivated. Multiple comparisons may also provide the potential for Type I error, suggesting caution in the interpretation of the one statistically significant effect of more homeless days on motivation.

Additionally, women in this study had agreed to enter a clinical trial to address alcohol and drug use, and a large proportion was recruited directly from a detoxification program. Therefore they may have been more motivated to change alcohol and drug use than other samples of homeless or low income housed women. An observational study of homeless women using drugs and alcohol, recruited from shelters or through street outreach, found that 72% reported high motivation to quit using cocaine and 56% reported high motivation to quit using alcohol. (2) Our findings were somewhat higher among both women experiencing homelessness and housed women (91% and 89% endorsing high importance to change drug use respectively, and 76% and 77% endorsing high importance to change alcohol use respectively). This suggests that entering an addiction study might increase reported motivation to change substance use. However, there is no reason to believe that entering the trial would differentially affect responses of homeless women compared to those women continuously housed, especially since the samples were quite closely matched on a number of demographic, physical and mental health, and service use measures. In addition, motivation to change or seek help were not entry criteria, receipt of addiction treatment was not required by the study, and most people who enter detoxification do not follow-up with addiction treatment, suggesting that the sample is likely representative of low income and homeless women who have some contact with health services. Finally, the definition of homelessness used may not have readily distinguished women with longer term chronic homelessness.

Study strengths include a focus on an urban, disadvantaged population of women. In addition, the consistency of associations across measures of motivation, suggest that the findings have merit despite the study limitations. The study also shows the similarity in demographics and health characteristics between low income continuously housed and women experiencing homelessness with substance dependence, suggesting that regardless of homelessness, these populations may be more similar in their motivation and need for addiction services than previously assumed.

Scientific Significance and Future Directions

Our finding that women experiencing homelessness and substance dependence do not appear to differ compared to continuously housed women in endorsing high motivation to change substance use is encouraging. That more days of homelessness were also not associated with motivation to change (except a greater proportion who endorsed high importance to change drug use), suggests that assumptions about the homeless population's lack of interest or ability to benefit from addiction treatment interventions should be questioned. Further research with homeless women not entering addiction treatment, and those where the homeless history is more complete, is needed to confirm this study's

findings. In addition, teasing out factors associated with motivation for addiction treatment is needed to identify other facilitators to treatment entry. Such research would represent next steps toward improving treatment access for this highly vulnerable, yet apparently motivated population.

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References

1. Reardon ML, Burns AB, Priest R, Sachs-Erickson N, Lang AR. Alcohol use and other psychiatric disorders in the formerly homeless and never homeless: Prevalence, age of onset, comorbity, temporal sequencing, and service utilization. Subst Use Misuse. 2003; 38:601–644. [PubMed: 12747399]
2. Nyamathi A, Longshore D, Galaif ER, Leake B. Motivation to stop substance use and psychological and environmental characteristics of homeless women. Addict Behav. 2004; 29:1839–1843. [PubMed: 15530726]
3. Wenzel SL, Tucker JS, Elliot MM, Hambarsoomians K, Perlman J, Becker K, Kollross C, Golinelli D. Prevalence and co-occurrence of violence, substance use and disorders, and HIV risk behavior: a comparison of sheltered and low income women in Los Angeles county. Prev Med. 2004; 39:617–634. [PubMed: 15313103]
4. Robertson JM, Zlotnick C, Westerfelt A. Drug use disorders and treatment contact among homeless adults in Alameda County, California. AJPH. 1997; 87:221–28.
5. Zlotnick C, Tam T, Robertson MJ. Disaffiliation, substance use, and existing homelessness. Subst Use Misuse. 2003; 38:577–599. [PubMed: 12747398]
6. Gregorie TK. Subtypes of alcohol involvement and their relationships to exits form homelessness. Subst Use Misuse. 1996; 31:1333–1357. [PubMed: 8879077]
7. Weinreb L, Rog D, Henderson K. Exiting shelter: An epidemiological analysis of barriers and facilitators for families. Soc Serv Review. 2010; 84:597–614.
8. Wenzel SL, Burnam MA, Koegel P, Morton SC, Miu A, Jinnett KJ, et al. Access to inpatient or residential substance abuse treatment among homeless adults with alcohol or other drug use disorders. Med Care. 2001; 39:1158–69. [PubMed: 11606870]
9. Nyamathi AM, Stein JA, Dixon E, Longshore D, Galaif E. Predicting positive attitudes about quitting drug and alcohol use among homeless women. Psychol Addict Behav. 2003; 17:32–41. [PubMed: 12665079]
10. Sosin MR, Grossman SF. The individual and beyond: A socio-rational choice model of service participation among homeless adults with substance abuse problems. Subst Use Misuse. 2003; 38:503–49. [PubMed: 12747396]
11. Geissler LJ, Bormann CA, Kwiatkowski CF, Braucht GN, Reichardt CS. Women, homelessness, and substance abuse. Psychol Women Q. 1995; 19:65–83.
12. Baggett TP, OConnell JJ, Singer DE, Rigotti NA. The unmet health care needs of homeless adults: A national study. AJPH. 2010; 100:1326–1333.
13. Kertesz SG, Larson MJ, Cheng DM, Tucker JA, Winter M, Mullins A, et al. Need and non-need factors associated with addiction treatment utilization in a cohort of homeless and housed urban poor. Med Care. 2006; 44:225–33. [PubMed: 16501393]

14. Brickner, PW.; Scharer, LK.; Conanan, BA.; Savarese, M.; Scanlan, B. Under the safety net: The health and social welfare of the homeless in the United States. WW Norton; NY: 1990.
15. Wen CK, Judak PL, Hwang SW. Homeless people's perceptions of welcomeness and unwelcomeness in healthcare encounters. J Gen Intern Med. 2007; 22:1011–1017. [PubMed: 17415619]
16. Bird CE, Jinnett KJ, Burnam MA, Koegel P, Sullivan G, Wenzel SL, Ridgely MS, Morton SC, Miu A. Predictors of contact with public service sectors among homeless adults with and without alcohol and other drug disorders. J Stud Alcohol. 2002; 63:716–725. [PubMed: 12529072]
17. Hunter J, Getty C, Kemsley M, Skelly A. Barrier to providing healthcare to homeless persons: A survey of provider's perception. Health Values. 1991; 15:3–11.
18. Kessler RC, Andrews G, Mroczek D, et al. The World Health Organization Composite International Diagnostic Interview short-form (CIDI-SF). Int J Methods Psychiatr Res. 1998; 7:171–185.
19. Williams EC, Horton NJ, Samet JH, Saitz R. Do brief measures of readiness to change predict alcohol consumption and consequences in primary care patients with unhealthy alcohol use? Alcohol Clin Exp Res. 2007; 31:428–435. [PubMed: 17295727]
20. LaBrie JW, Quinlan T, Schiffman JE, Earleywine ME. Performance of alcohol and safer sex change rulers compared with readiness to change questionnaires. Psychol Addict Behav. 2005; 19:112–115. [PubMed: 15783287]
21. Bertholet N, Cheng DM, Palfai TP, Samet J, Saitz R. Does readiness to change predict subsequent alcohol consumption in medical inpatients with unhealthy alcohol use? Addict Behav. 2009; 34:636–640. [PubMed: 19428189]
22. Ware JE, Kosinski M, Keller SD. A 12-Item Short-Form Health Survey: Construction of scales and preliminary tests of reliability and validity. Med Care. 1996; 34:220–233. [PubMed: 8628042]
23. Cheak-Zamora NC, Wyrwich KW, McBride TD. Reliability and validity of the SF-12v2 in the medical expenditure panel survey. Qual Life Res. 2009; 18:727–735. [PubMed: 19424821]
24. Katz JN, Chang LC, Sanga O, et al. Can comorbidity be measured by questionnaire rather than medical record review. Med Care. 1996; 34:73–84. [PubMed: 8551813]
25. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med. 2001; 16:606–613. [PubMed: 11556941]
26. Sheehan, D.; Janavs, J.; Baker, R.; Harnett-Sheehan, K.; Knapp, E.; Sheehan, M. The Mini International NeuroPsychiatric Interview (MINI). University of South Florida; Version 5.5.0 2004
27. Allensworth-Davies D, Cheng DM, Smith PC, Samet JH, Saitz R. The short inventory of problems – modified for drug use (SIP-DU): Validity in a primary care sample. Am J Addict. 2012; 21:257–62. [PubMed: 22494228]
28. Diggle, P.; Liang, K-Y.; Zeger, SL. Analysis of longitudinal data. Oxford New York: Clarendon Press; Oxford University Press; 1995.
29. SAS, Version 9.2. SAS Institute; Cary, NC: 2010.
30. DiClemente CC, Schlundt D, Gemmell L. Readiness and stages of change in addiction treatment. Am J Addict. 2004; 13:103–19. [PubMed: 15204662]
31. Prochaska JO, Di Clemente CC, Norcross JC. In search of how people change. Am Psychol. 1992; 47:1102–14. [PubMed: 1329589]
32. Kelly FJ, Urbanoski KA, Hoeppner BB, Slaymaker V. "Ready, willing and (not) able to change": Young adults' response to residential treatment. Drug Alcohol Depend 2012. 2012; 121:224–230.
33. Collins SE, Logan DE, Neighbors C. Which came first: the readiness or the change? Longitudinal relationships between readiness to change and drinking among college drinkers. Addiction. 2012; 105:1899–1909. [PubMed: 20854333]
34. Collins SE, Malone DK, Larimer ME. Motivation to change and treatment attendance as predictors of alcohol-use outcomes among project-based Housing First residents. Addict Behav. 2012; 37:931–939. [PubMed: 22513197]
35. Nyamathi A, Keenan C, Bayley L. Differences in personal, cognitive, psychological, and social factors associated with drug and alcohol use and nonuse by homeless women. Research on Nursing and Health. 1998; 21:525–532.

36. Kelly PJ, Blacksin B, Mason E. Factors affecting substance abuse treatment completion for women. Issues Ment Health Nurs. 2001; 22:287–304. [PubMed: 11885213]

Table 1

Baseline characteristics of 154 women with alcohol or other drug dependence assessed at study entry

Characteristic	Homeless* n=69	Housed n=85	P value
Mean Age, years (SD)[1]	35.8 (9.8)	36.7 (11.5)	0.58
Race/Ethnicity n (%)			
Non-Hispanic White	35 (50.8)	41 (48.2)	0.51
Non-Hispanic Black	23 (33.3)	36 (42.4)	
Other	6 (8.7)	5 (5.9)	
Hispanic	5 (7.2)	3 (3.5)	
Education n (%)			
<High school	19 (27.5)	25 (29.4)	0.80
High school or more	50 (72.5)	60 (70.6)	
Health insurance n (%)	54 (78.3)	67 (78.8)	0.93
Income from all sources n (%)			
<$20,000	39 (56.5)	46 (54.1)	0.76
$20,000 or more	30 (43.5)	39 (45.9)	
Unemployed n (%)	36 (52.2)	35 (41.2)	0.17
Has a current partner n (%)	44 (63.8)	57 (67.1)	0.67
Currently has children n (%)	46 (66.7)	53 (63.1)	0.64
Troubled by alcohol problems n (%)	49 (71.0)	47 (55.3)	0.04
Drinking NIAAA-defined hazardous amounts n (%)[2]	46 (66.7)	49 (57.6)	0.44
Troubled by drug problems n (%)	62 (89.9)	74 (87.1)	0.59
Used heroin, cocaine, &/or marijuana last 30 days n (%)	65 (94.2)	77 (88.2)	0.26
Mean SF-12 MCS (SD)[3]	28.2 (10.5)	30.4 (9.3)	0.16
Mean SF-12 PCS (SD)[4]	42.7 (8.3)	40.5 (8.3)	0.11
Mean Katz comorbidty (SD)[5]	0.6 (0.9)	0.8 (1.2)	0.48
Positive depression screen n (%)[6]	59 (85.5)	67 (79.8)	0.35
Current PTSD n (%)[7]	29 (42.0)	29 (34.1)	0.31
Mean SIP lifetime alcohol score (SD)[8]	10.2 (5.2)	8.0 (5.9)	0.03
Mean SIP lifetime drug score (SD)[8]	12.7 (3.4)	12.2 (4.0)	0.48
Any outpatient addiction treatment last 90 days n (%)[9]	29 (42.0)	39 (45.9)	0.63
Any 12 step meeting (e.g. AA, NA, CA) last 90 days n (%)[10]	33 (47.8)	34 (40.0)	0.33
Randomization group n (%)			
Control	27 (39.1)	43 (50.6)	0.16
Intervention	42 (60.9)	42 (49.4)	
Any MET sessions n (%)[11]	16 (23.2)	28 (32.9)	0.18

*Homeless=at least one day on the street or in a shelter in the last 90 days

[1]SD=standard deviation;

[2]NIAAA=National Institute on Alcohol Abuse and Alcoholism. NIAAA hazardous amounts are more than 7 drinks per week or more than 3 drinks per occasion for women;

[3] MCS= Mental Component Score of the SF-12 measure (21);

[4] PCS=Physical Component Score of the SF-12 measure (21);

[5] Health comorbidity measured by the Katz et al (22, 23);

[6] PTSD=Post Traumatic Stress Disorder measured using the MINI (26);

[7] Measured using the Patient Health Questionnaire (PHQ-9) (24, 25);

[8] SIP=Short Inventory of Problems for Alcohol and for Drug Use (27);

[9] Outpatient addiction treatment=visit with a doctor (other than a psychiatrist), physician assistant, nurse practitioner, nurse or other healthcare provider;

[10] 12-step programs: AA=Alcoholics Anonymous, NA=Narcotics Anonymous, CA=Caffeine Anonymous.

[11] Motivational Enhancement Treatment

Table 2

Baseline motivation to change (dichotomized as high motivation vs. lower)

Measure of High Motivation to Change	Study Time Point	Homeless no./N (%)	Housed no./N (%)	P value
Very important to change drinking	Baseline	38/50 (76.0)	44/57 (77.2)	0.88
	Three months	19/29 (65.5)	26/43 (60.5)	0.66
	Six months	9/19 (47.4)	28/42 (66.7)	0.15
	Twelve months	11/20 (55.0)	29/50 (58.0)	0.82
Very ready to change drinking	Baseline	38/52 (73.1)	42/57 (73.7)	0.94
	Three months	20/31 (64.5)	32/45 (71.1)	0.54
	Six months	13/19 (68.4)	30/42 (71.4)	0.81
	Twelve months	17/22 (77.3)	32/50 (64.0)	0.27
Very confident you would succeed in changing drinking habits	Baseline	33/55 (60.0)	41/65 (63.1)	0.73
	Three months	20/36 (55.6)	50/63 (79.4)	0.01
	Six months	17/26 (65.4)	47/59 (79.7)	0.16
	Twelve months	23/29 (79.3)	52/70 (74.3)	0.60
Very important to change drug use	Baseline	60/66 (90.9)	71/80 (88.8)	0.69
	Three months	29/36 (80.6)	67/73 (91.8)	0.09
	Six months	25/32 (78.1)	62/72 (86.1)	0.31
	Twelve months	24/27 (88.9)	59/70 (84.3)	0.56
Very ready to change drug use	Baseline	51/66 (77.3)	68/80 (85.0)	0.23
	Three months	29/37 (78.4)	60/75 (80.0)	0.84
	Six months	22/32 (68.8)	54/73 (74.0)	0.58
	Twelve months	21/28 (75.0)	54/72 (75.0)	1.00
Very confident you would succeed in changing drug use	Baseline	33/66 (50.0)	50/80 (62.5)	0.13
	Three months	26/38 (68.4)	54/80 (67.5)	0.92
	Six months	20/34 (58.8)	51/80 (63.8)	0.62
	Twelve months	21/30 (70.0)	67/89 (75.3)	0.57

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Table 3

Longitudinal association between homelessness and high motivation to change alcohol and drug use across all time points *

Independent Variable[1]	***Very important right now to change drinking***[a]	***Very ready to change drinking***[b]	***Very confident that you would succeed in changing drinking habits***[c]	***Very important right now to change drug use***[d]	***Very ready to change drug use***[e]	***Very confident that you would succeed in changing drug use habits***[f]
At least one night in shelter/on street in past three months	0.67 (0.34, 1.31) p=0.24	0.84 (0.44, 1.60) p=0.61	0.76 (0.46, 1.26) p=0.29	0.75 (0.33, 1.73) p=0.50	0.79 (0.43, 1.42) p=0.43	0.78 (0.48, 1.27) p=0.32
Age in years †	1.04 (0.99, 1.08) p=0.10	1.00 (0.96, 1.05) p=0.85	0.99 (0.96, 1.03) p=0.70	1.01 (0.96, 1.06) p=0.77	1.04 (1.01, 1.08) p=0.01	1.02 (0.99, 1.04) p=0.29
Education						
Less than high school	1.13 (0.58, 2.20) p=0.73	1.07 (0.54, 2.12) p=0.85	1.50 (0.77, 2.92) p=0.23	1.26 (0.48, 3.34) p=0.64	0.93 (0.49, 1.76) p=0.82	**1.88 (1.06, 3.32) p=0.03**
High school or more	Referent	Referent	Referent	Referent	Referent	Referent
SIP lifetime score † ‡	**1.14 (1.06, 1.23) p<0.001**	**1.13 (1.06, 1.20) p<0.001**	0.95 (0.89, 1.00) p=0.06	**1.16 (1.02, 1.31) p=0.02**	1.09 (1.00, 1.18) p=0.052	1.00 (0.93, 1.09) p=0.91
Any twelve–step (AA, NA, CA) meetings in past three months[g]	2.01 (0.98, 4.13) p=0.06	**2.33 (1.18, 4.60) p=0.02**	**1.74 (1.03, 2.97) p=0.04**	**2.52 (1.25, 5.07) p=0.01**	**2.24 (1.33, 3.79) p=0.002**	1.54 (0.99, 2.39) p=0.054
SF-12 Mental Component Summary score (MCS) †	0.99 (0.96, 1.02) p=0.61	1.01 (0.98, 1.04) p=0.36	1.01 (0.99, 1.04) p=0.26	0.99 (0.95, 1.02) p=0.47	1.02 (0.99, 1.05) p=0.19	**1.04 (1.02, 1.07) p<0.001**
Study Time Point						
Baseline	**2.83 (1.39, 5.75) p=0.004**	1.79 (0.87, 3.68) p=0.11	0.61 (0.33, 1.14) p=0.12	1.65 (0.80, 3.44) p=0.18	1.74 (0.91, 3.34) p=0.09	0.62 (0.36, 1.06) p=0.08
Three months	1.07 (0.51, 2.27) p=0.85	1.10 (0.52, 2.35) p=0.80	0.90 (0.48, 1.70) p=0.75	0.92 (0.43, 1.95) p=0.83	0.85 (0.48, 1.51) p=0.57	**0.54 (0.34, 0.85) p=0.01**
Six Months	1.20 (0.62, 2.32) p=0.59	1.12 (0.56, 2.22) p=0.75	0.78 (0.43, 1.42) p=0.42	1.23 (0.59, 2.54) p=0.58	1.25 (0.67, 2.31) p=0.48	0.80 (0.45, 1.40) p=0.43
Twelve Months	Referent	Referent	Referent	Referent	Referent	Referent

[1] This table represents six different multiple logistic regressions, one for each of the 6 motivation to change items.

* Odds ratios, 95% confidence intervals and p-values calculated based on empirical standard error estimates from generalized estimating equations logistic regression; models simultaneously adjust for all independent variables (see Methods) and study time point.

[a] Analyses based on 121 subjects (50 homeless, 57 housed at baseline) contributing 310 observations (118 homeless, 192 housed)

[b] Analyses based on 124 subjects (52 homeless, 57 housed at baseline) contributing 318 observations (124 homeless, 194 housed)

[c] Analyses based on 135 subjects (55 homeless, 65 housed at baseline) contributing 403 observations (146 homeless, 257 housed)

[d] Analyses based on 148 subjects (66 homeless, 80 housed at baseline) contributing 455 observations (160 homeless, 295 housed)

[e] Analyses based on 148 subjects (66 homeless, 80 housed at baseline) contributing 462 observations (162 homeless, 300 housed)

[f] Analyses based on 149 subjects (66 homeless, 80 housed at baseline) contributing 496 observations (167 homeless, 329 housed)

[g] AA=Alcoholics Anonymous; NA=Narcotics Anonymous; CA=Caffeine Anonymous.

† Odds ratios for age, SIP (Short Inventory of Problems) (27) lifetime summary score and MCS (Mental Component Score) (21) correspond to a 1 unit increase

‡ The SIP(Short Inventory of Problems) (27) score for alcohol was used for the drinking models, the SIP score for drug use for the drug models